

CERTIFICATE OF MAIL (37 CFR 1.8(a))

I hereby certify that this paper (along with any referred to as being attached or enclosed) is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, DC 20231 on _____ 2003.

Signed:

Laura Pulac

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of:

Lynn Bich-Quy Le et al.

Art Unit: Unknown

Examiner: Unknown

Serial No. 09/894,475

Attorney Docket No. 8032987

Filed: June 27, 2001

For: DISTORTION FREE LASER WELDED
FLUID BEARING DESIGN**AFFIDAVIT OF LYNN BICH-QUY LE
UNDER RULE 1.131**Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

1. I am one of the inventors of the subject application.
2. I am a Staff Engineer in the Motor Division of Seagate Technology, the owner of the subject application.
3. My educational background is mechanical engineering.
4. I have been a design engineer on motors for Seagate for the last five years and have specifically worked on fluid dynamic bearings, especially for use in spindle motors to be used in disc drives for the last five years.
5. Prior to April 14, 2000, the following acts occurred. I was advised and believe that laser welding the counterplate to the sleeve in a fluid bearing design is a technique where sealing the hydro-bearing fluid to prevent loss from the fluid bearing. The heat induced from the laser power during performing deep penetration welding seams can result in distortion of the counterplate. The outward bow of the counterplate increases the thrust axial gap, thereby impacting stiffness and wear contact conditions of the thrust bearing.
6. Therefore, I conducted computer simulations of solutions to this problem which are shown in Figs. 2-4; (the reference numbers have been added for purposes of this affidavit).
7. In conducting this computer simulation, I first modeled (Figure 1), the existing bearing which is defined with welding of the seam of a counterplate to a sleeve. In Figure 1, the counterplate 10 is shown attached to a portion of a sleeve 12. The dotted line figure of the counterplate 20 shows the ideal positioning of the counterplate relative to the sleeve 22. The actual position and resulting bowing of the counterplate 10 due to welding is shown by the counterplate labeled 10.

8. To eliminate this counterplate distortion due to laser welding, I, together with my co-inventors, conceived at least three possible modifications which are shown in Figures 2, 3 and 4 attached to this affidavit. In the simulation of Figure 2, a groove is cut at the interface of the counterplate 25 and the sleeve 27. The weld is shown at Figure 30. In this embodiment, a substantial portion of the sleeve is also cut away.
9. In a second embodiment as shown in Figure 3, the counterplate 30 is welded to a sleeve 35 at a weld 37. In this, a part of the counterplate and part of the sleeve are both cut away; however, the outer portion 39 of the sleeve is left intact.
10. In a further embodiment, shown in Figure 4, counterplate 42 is welded to a sleeve 44 at a weld 45. In this embodiment, groove 47 is cut into the sleeve outer diameter to prevent the counterplate from being distorted under thermal contraction forces.
11. Based on these simulations which were all conducted prior to April 14, 2000, I concluded that any of these approaches would be more successful than the prior art approach shown in Figure 1 in preventing bowing of the counterplate. In fact, later in 2000, the approach based on this research was incorporated into a Seagate motor design which continues to be produced.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Title 18, United States Code, §1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

By: 
Lynn Bich-Quy Le

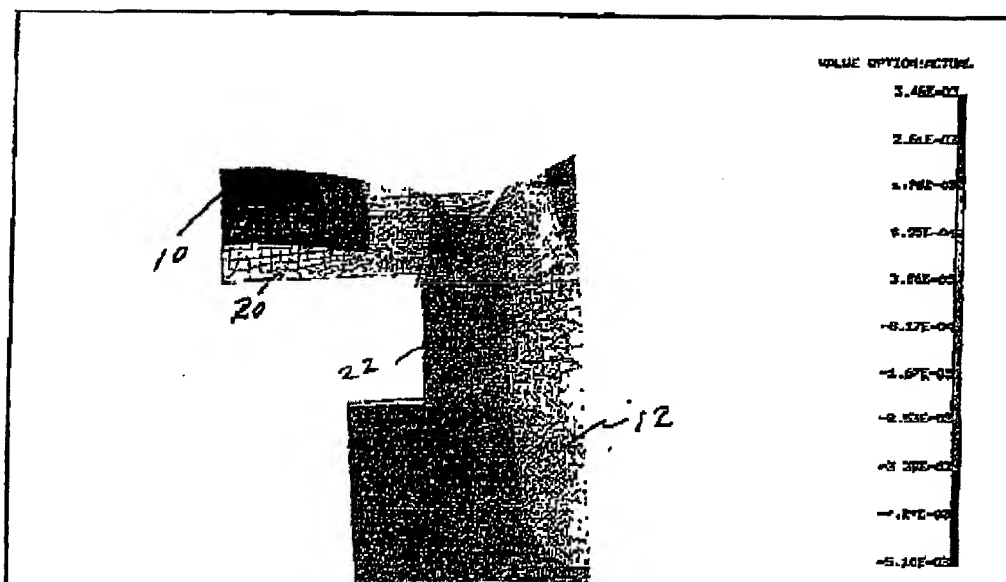


Fig 1

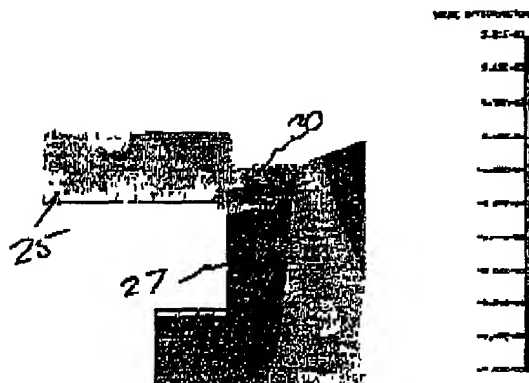


Figure 1

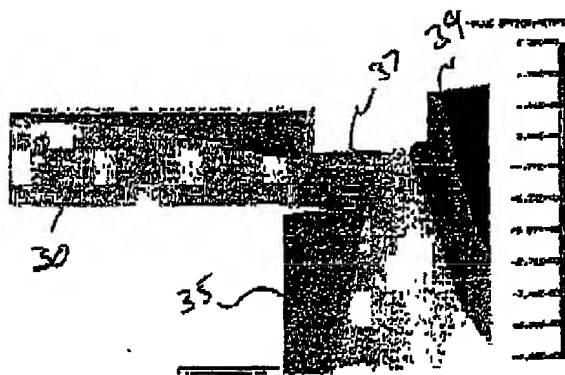


Figure 3

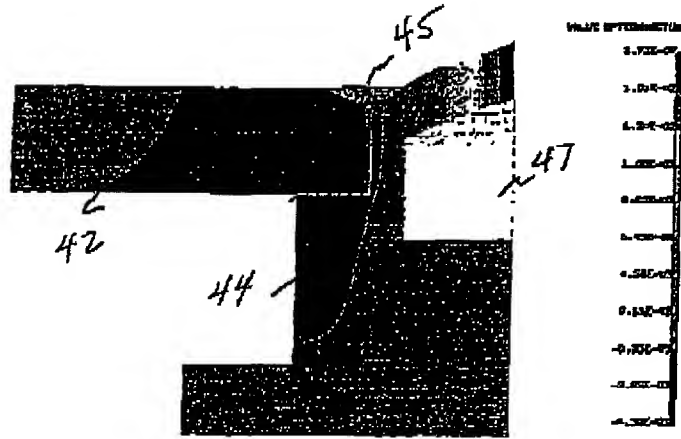


Fig 4